Evaluating Feasibility

Small Wind Systems Tutorial
Village Power Conference Workshop

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Part 7

Technical Feasibility Issues

- Will the system meet the load?
- How much performance risk due to resource uncertainty?
- Can the systems be supported over the long term?
- Risk of Severe Hurricanes or Typhoons
- Corrosion risks, particularly guy-wires
- Is the wind turbine a mature, proven design?
- Strength of manufacturers warranty

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Economic Feasibility Issues

- First costs are critically important to most customers
- For grid-intertied or fuel savings applications payback period is important
- Life cycle costs are important to governments and financiers
- Wind power economics can vary over a wide range due to $P = V^3$

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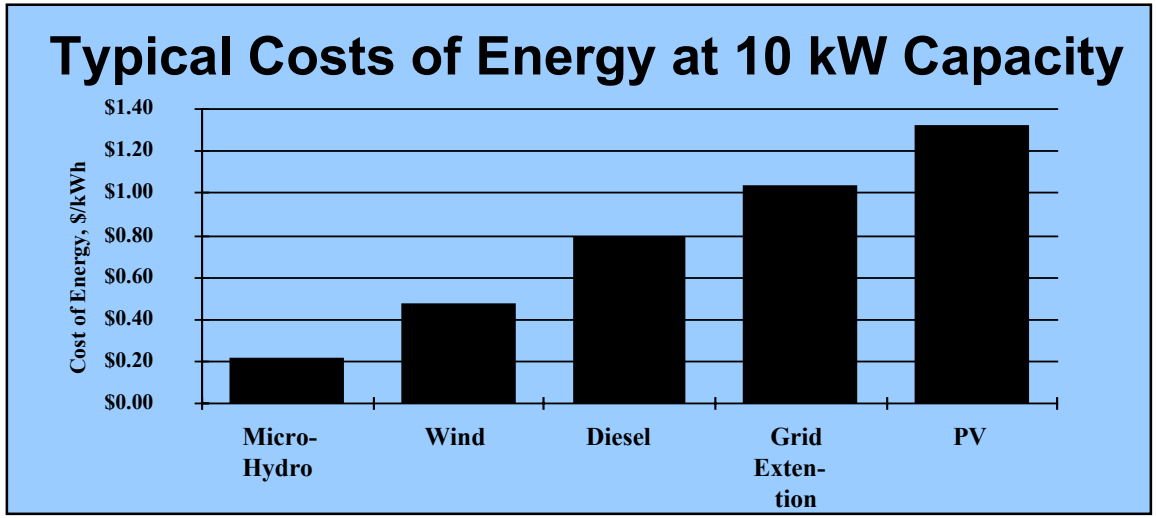
Economic Feasibility Issues

- Common alternatives are grid-extension, diesel generators and solar
- Alternatives to grid-extension are not considered nearly enough
- Higher cost alternatives reduce minimum wind resource requirements



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Wind vs. PV vs. Hybrids

- Small wind energy is typically ½ - 1/4 the cost of PV, but is much more site specific
- BOS equipment (batteries, inverters, switchgear, etc.) is essentially the same for all-wind or all-PV
  - Trade-off analyses can done directly as wind components vs. solar components
- Wind turbine efficiencies and cost/kW vary product to product
  - Not possible to generalize $/W, or more importantly $/annual kWh

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Wind vs. PV vs. Hybrids

- PV module efficiencies vary technology to technology, but not much product to product
  - Easier to generalize $/W and $/annual kWh
- Small wind generally gets less expensive as turbine size goes up
- PV essentially has no economies of scale
- PV is much more modular; wind comes in larger “chunks” (50 W vs. 1000 W)

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Wind vs. PV vs. Hybrids

- Hybrid systems, with both wind and solar, generally offer the best compromise in cost and performance, at least up to ~ 25 kW
- Rural users like the dependability of solar energy and they like the "luxuries" that small wind can support (eg., refrigerators and washing machines)
- All-PV system owners often upgrade their system by adding wind

Think Hybrids!

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